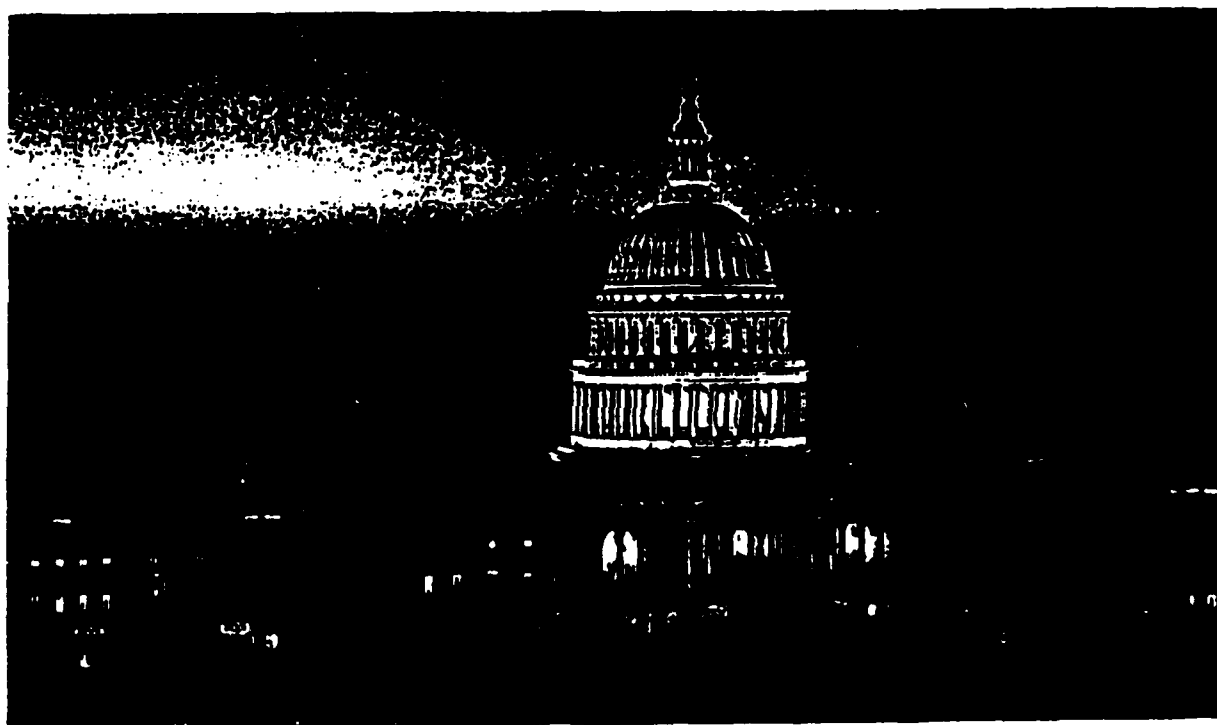


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SEPTEMBER 1987

# MANPRINT RISK ASSESSMENT



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SSC-NCR

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Analysis Integration Branch

Personnel Plans Division

Manning Integration Directorate

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# MANPRINT RISK ASSESSMENT

(MRA)

SEPTEMBER 1987

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# MANPRINT RISK ASSESSMENT

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## CHAPTER 1

### INTRODUCTION

1.1 The MANPRINT Risk Assessment (MRA) has been developed as a tool to help the Materiel Systems Project Officer (MSPO) evaluate the MANPRINT risk associated with the development of an emerging materiel system, Product Improvement Program (PIP) or Non-Developmental Item (NDI). Although designed primarily for use by the project officer, this tool can be used effectively by a variety of personnel associated with the Materiel Acquisition Process (MAP). When used properly, it can provide a wealth of information about the current status and progress of a proposed system or materiel acquisition program.

1.2 The MRA may be completed at any time during the MAP. At the time it is completed, the MRA provides a "snapshot" in time depicting the degree of uncertainty associated with a specific system. If the MRA is completed in several iterations, over a period of time, the results of each iteration can be compared to establish a program's progress. The MRA may be completed by the MSPO working in conjunction with the MANPRINT domain experts, prior to the first meeting of the MANPRINT Joint Working Group (MJWG) in order to identify the high risk issues to be raised to MJWG participants.

1.3 It is important to stress that the MRA is a tool designed to help in planning and evaluating specific materiel acquisition programs. It can provide information concerning areas requiring additional analysis and information pertaining to the allocation of additional resources. It is designed to both structure and stimulate thought and to facilitate communication between individuals and activities involved in the acquisition program.

1.4 The heart of the MRA is contained in Chapters Two through Nine. Chapter Two develops information of a general nature on the proposed new system. Chapters Three through Eight are devoted to each of the six domains of MANPRINT. Each of these chapters consists of a series of questions. There are four possible responses to each question: YES, NO, UNKNOWN, and NOT APPLICABLE. Each of the questions has been structured so that a response of "YES" represents minimum risk, "NO" represents moderate risk, and "UNK" represents maximum risk. "N/A" answers are for those questions that are not applicable to the program being evaluated. Space

has been provided at the bottom of each page and at the end of each chapter to tally the responses to the questions.

1.5 The MRA is much like a programmed text. The quality and utility of the MRA depends on the degree of effort put forth by the Action Officer. It is not enough to simply respond to each question with a "YES" response. When any question is answered with a "YES" it implies that the Action Officer is able to document the rationale for the response.

1.6 To complete the MANPRINT Risk Assessment:

a. Scan the questions in each chapter to determine the type of information required.

b. Starting with Chapter Two, read each question carefully and check the appropriate response in the block provided at the end of the question. Remember that documentation or supporting rationale should be available to substantiate any "YES" response.

c. Once all questions in a chapter have been answered, tally the number of responses, by type, in the spaces provided at the bottom of each page. Sum the page totals at the end of the chapter, then proceed to the next chapter.

d. After completing chapters two through eight, proceed to Chapter Nine which summarizes the assessment of risk.

1.7 Appendix B contains selected MANPRINT information about the MANPRINT program, the HARDMAN Comparability Methodology (HCM), the Early Comparability Analysis (ECA), and the Training Effectiveness Analysis (TEA) methodology. Appendix C contains selected MANPRINT acronyms. Appendix D is a glossary of commonly used MANPRINT/Systems Acquisition terms.

## CHAPTER 2

### SYSTEM

2.1 A system is an assemblage or combination of things or parts forming a complex or unitary whole. For the purposes of MANPRINT, the term system is meant to include more than just a single piece of materiel such as a tank. The total system concept includes not only the weapon system, but also all of the people and equipment necessary to field and sustain the weapon system in peacetime and combat. Associated support items of equipment, other support equipment, and training devices as well as the principle item of equipment are considered part of the total system. It is important to keep the idea of a total system in mind as you respond to the questions in this and succeeding chapters.

2.2 The questions in this chapter are designed to encourage you to consider the risk associated with the acquisition program and the current system definition.

#### SYSTEM GOAL :

OPTIMIZE TOTAL SYSTEM  
PERFORMANCE

1. Have you attended either the MANPRINT Staff Officer Course or the MANPRINT Manager's Course?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. Do you understand MANPRINT and the goals of the MANPRINT program?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Do you understand the total system concept?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Do you understand the concept of system performance (i.e. how personnel, equipment and the environment interact to affect system performance)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

5. Have you considered that the total system involves not only the principal item of equipment, but also the associated support equipment (ASE), associated support items of equipment (ASIOE), other support equipment (OSE), and training devices?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

6. Do you have a solid working knowledge of the analytical techniques and methodologies that are available to assist you in your efforts to develop and field the proposed system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

7. Have resources been planned for and programmed to support the conduct of analytical (MANPRINT) methodologies?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

8. Have iterative applications of analytical methodologies (e.g., COEA, ECA, MRA) been planned?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

9. If ASE, ASIDE, OSE and training devices are required, have their development, acquisition, and fielding been planned to coincide with the fielding of the end item?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

10. Will the acquisition and fielding of the proposed system occur without the requirement for development of new:

a. ASE?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. ASIDE?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. OSE?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

11. Will system fielding occur without requiring increased density of currently fielded equipment (ASE, ASIDE, OSE)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Does the proposed system have a distinct predecessor system(s) that it is designed to replace?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

13. Have resource intensive (high driver) tasks that are present on the predecessor system been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

14. Is there a Manpower, Personnel, or Training (MPT) solution to overcome "high driver" tasks?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

☐ ☐ ☐ ☐

15. Have "high driver" tasks on existing equipment been eliminated from the proposed system design?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

16. Has the development of new high driver tasks been avoided?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

17. Have appropriate soldier cost factors been identified and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

18. Have appropriate usage rates been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

19. Have desired equipment densities been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

20. Has a Logistics Support Analysis (LSA) been initiated for the proposed system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

21. Has an independent estimate of the cost of the proposed program been conducted?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

22. Have trade-off analyses been conducted for all studies?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

23. Have performance standards, soldier cost factors, usage rates, equipment densities and other program measures remained consistent throughout the spectrum of analyses and evaluations?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

24. Have MANPRINT issues significantly influenced the acquisition strategy? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

25. Is this a proposed Product Improvement Program (PIP)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

26. Is the proposed (new) program the result of a Pre-Planned Product Improvement (PPI)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

27. Have doctrine and organizational changes and training been rejected as satisfying the MAA deficiency? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

28. Has the MAA deficiency been sufficiently defined such that there is a reasonable probability that acquisition of the proposed system will correct it? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

29. Has a clearly-defined, attainable program goal been determined and documented? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

30. Have the assumptions that were made to support development of the proposed system been determined and documented? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

31. Have the numerous constraints that may affect development of the proposed system been determined and documented? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

32. Have the critical issues confronting the proposed program been developed and documented? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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PAGE  
TOTALS:  
2-5

33. Have the minimum system performance requirements been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

34. Has a clear and consistent set of total system performance measures been established and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

35. Have appropriate system performance standards been developed and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

36. Do the performance standards include as a minimum accuracy, user speed of performance, skill development time, and user satisfaction?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

37. Does the proposed program call for Preplanned Product Improvements (P<sup>3</sup>I)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

38. Has a plan been developed for Continuous Comprehensive Evaluation (C<sup>2</sup>E)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

39. Has the System MANPRINT Management Plan (SMMP) been developed and initiated?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

40. Does the proposed system have a clearly defined mission profile and operational mode summary?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

41. Have the design drivers for the proposed system been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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42. Have all the potential geographical areas and environments that the system may be deployed to and operate in been determined and considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

43. Have the environmental factors (e.g., climate, terrain) that have a critical impact on the performance of the proposed system and its design been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

44. Does the effectiveness of the proposed system depend only on technologies that are currently available?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

45. Does the proposed program capture the advantages of advanced technology in the system design?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

46. Have component performance requirements been identified and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

47. Have component performance standards been identified and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

48. Have the performance measures used to evaluate component performance been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

49. Have the system components that are least reliable been identified and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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PAGE  
TOTALS:

50. Have the impacts of component failures been identified and addressed? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

51. Have the impacts of system failure been identified and addressed? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

52. Is the system capable of sustained operations in a Nuclear, Chemical, Biological environment? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

53. Can the assigned individual/crew conduct effective sustained combat operations? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

54. Can the proposed system be effectively and efficiently operated/maintained with reduced manning for sustained periods of time? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

55. Is the proposed system supportable and affordable in terms of manpower, personnel and training issues? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

56. Has the system replacement scheme to support the fielding plan been determined? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

57. Have the effects, the system replacement scheme will have on force structure during fielding, been determined? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

58. Have changes to the current force structure, caused by fielding the proposed system, been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

59. Have the impacts on organizational changes in the support organization structure, caused by the proposed system, been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

60. Have the impacts on projected force structure, caused by the fielding of the proposed system, been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

61. Have the impacts on existing equipment, caused by the fielding of the proposed system, been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

62. Has the proposed system's impact on current/future doctrine been assessed and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

63. Will the proposed system be fielded without requiring an increase in total Army end strength?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

64. Have the effects on the civilian force, caused by development and fielding of the proposed system, been determined and documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

65. Have the Engineering Change Proposals (ECP) been evaluated concerning their impact on MANPRINT issues?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

66. Can the creation of a significant personnel bubble, during the fielding of the proposed system, be avoided?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

67. Can the effects of a training bubble, created during the fielding of the proposed system, be minimized?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

# CHAPTER 2 SYSTEM TOTALS

PAGE 2-2	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-3	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-4	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-5	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-6	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-7	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-8	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-9	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

PAGE 2-10	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

CHAPTER 2 TOTAL	YES	NO	UNK	N/A
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## CHAPTER 3

### MANPOWER

3.1 The term "Manpower" refers to the number of soldiers and civilians required or authorized to operate and support a materiel system. It is important to recognize that "Manpower Requirements" are an acknowledged need for a position in a TOE or TDA. "Manpower Authorizations" are the official approval to establish the positions. Remember, manpower authorizations will normally be less than manpower requirements due to budgetary constraints.

3.2 Your answers to the following questions should assist in the assessment of the Manpower Domain:

#### MANPOWER GOAL :

MINIMIZE THE NUMBER OF SOLDIERS

1. Will fewer units or positions be required to support the new system? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. Will the new system offer manpower savings? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Will the system change the ratio of officer, warrant officer, enlisted and civilians? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Have all MOS, ASI and SQI needed to support the proposed system been determined? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

5. Considering manning levels, has the grade ratio base been determined and documented in order to establish upward mobility? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

6. Has the grade level distribution of this system (Specific number of E-3/E-4, E-5/E-6, E-7/E-8 or E-9) been determined/ documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

7. Have personnel strength levels for this system been identified across the total Army (including National Guard and Army Reserve)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

8. Have combat versus combat support and combat service support positions been identified for this system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

9. If this system has increased requirements for supply items, have the cost and logistics implications been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

10. When developing or improving a system that reduces the number of operators, maintainers or repairers because of a PIP or other changes (e.g., robotics or mechanics), was a determination made of the:

a. Impact of increased operations requirements in a sustained mission for the number of remaining positions?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Impact of mechanical failure and increased task requirements on crew members?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

11. Has the impact of an increase or decrease in positions on the MOS, grade structure and total Army strength been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Have the positions for operators, maintainers and repairers managed by other proponents/programs been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

13. If the proposed system requires personnel (operators, maintainers, repairers, and other support personnel) who are managed by multiple proponents, have resulting impacts been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

PAGE  
TOTALS:

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14. Has the impact of having operators, maintainers, repairers and other support personnel for this system who belong to another proponent been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

15. Has the impact of the average number of soldiers in the MOS who will be in a Transients, Trainees, Holders, and Students (TTHS) status during the year been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

16. Has the number of soldiers required to sustain the replacement pipeline of the MOS for this system been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

17. An increase of tasks for a position may require creation of an additional position(s). Has the impact of workload on manpower requirements been determined/documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

18. Will this system avoid an increase in the number or difficulty of tasks for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

19. Has the impact on maintenance manpower requirements on this system been determined/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

20. Has the impact of unprogrammed losses on workload and task completion been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

21. If reducing the operating crew of a system is being considered, are the facts of: (a) task performance may be seriously degraded; (b) the distribution of the saved crew members; and (c) continuous operations, being taken into consideration?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

22. If consideration is being given to increasing the operating crew of a system, has the impact on manpower for the total Army been determined/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

23. Was manpower addressed in the ROC for your system (Chap 11, AR 70-2)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

24. Have specified manpower constraints for each affected MOS been placed in the SMP?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

25. The Manpower Requirements Criteria (MARC) can be used as a tool for determining wartime combat support and combat service support manpower requirements as opposed to positions for combat (AR 570-2). Have the manpower issues in this area been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

26. Has the fact that civilians may be the operator, maintainer or repairer for this system been determined/documentated?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

27. Has the impact of this system on the force structure during replacement or phase in for the total force been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

28. Has a manpower estimate been conducted to determine the total number of personnel (military, civilian and contractor) expressed both in total personnel and man-years that will be required to operate, maintain and support the system upon full operational deployment?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

29. If a plus-up is required in authorizations for existing units, have trade-offs been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

30. If the system is a major defense acquisition program, has the manner in which it would be operationally deployed been determined if no increases in military and civilian end strengths were authorized above those for the fiscal year in which such an estimate is submitted?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

# CHAPTER 3 MANPOWER TOTALS

PAGE 3-2	YES [ ]	NO [ ]	UNK [ ]	N/A [ ]
PAGE 3-3	YES [ ]	NO [ ]	UNK [ ]	N/A [ ]
PAGE 3-4	YES [ ]	NO [ ]	UNK [ ]	N/A [ ]
PAGE 3-5	YES [ ]	NO [ ]	UNK [ ]	N/A [ ]
PAGE 3-6	YES [ ]	NO [ ]	UNK [ ]	N/A [ ]

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CHAPTER 3 TOTAL

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CHAPTER 4

### PERSONNEL

4.1 Personnel is the domain concerned with the quality and qualifications of individuals who will operate, maintain and repair Army systems. The personnel domain is specifically concerned with skills, abilities, aptitude and knowledge, physical and psychomotor characteristics, distribution of quality and quantities, grade structure and MOS information.

4.2 Your answers to the following questions should assist in the assessment of the Personnel Domain:

PERSONNEL GOAL :

AVOID SKILL CREEP

MAINTAIN SOLDIER SATISFACTION

1. Have the physical strength capacity (MEPSCAT) requirements been determined/ documented (light to very heavy) for the tasks of the:

a. Operator?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
c. Repairer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

2. Have mental category constraints been considered for the soldiers who must operate, maintain and repair the system?

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

3. Have ASVAB aptitude area(s) been determined to classify soldiers into the MOS for the operator, maintainer and repairer?

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

4. Have the minimum physical category standards under the PULHES been determined/documentated for the:

a. Operator?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
c. Repairer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

5. Have personnel costs associated with all operator and support personnel been evaluated and compared for all system alternatives?

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

6. Have physical limitations (such as color vision, acuity, or hearing) been determined for the:

a. Operator?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
c. Repairer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

7. Has the TAD been used to assist in determining the expected distribution of mental categories?

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

8. Was the possibility identified that a new MOS may have to be established for this system for the:

a. Operator?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
c. Repairer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

9. Has the impact of a new MOS on recruiting and retention for this system been identified for the:

a. Operator?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
c. Repairer?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

10. Has the impact of the proposed system on the reassignment system (turn around time for CONUS to OCONUS) been determined for the:

	YES	NO	UNK	N/A
a. Operator?	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	[ ]	[ ]	[ ]	[ ]
c. Repairer?	[ ]	[ ]	[ ]	[ ]

11. Has the impact of the proposed system on promotions and career development been determined for the:

	YES	NO	UNK	N/A
a. Operator?	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	[ ]	[ ]	[ ]	[ ]
c. Repairer?	[ ]	[ ]	[ ]	[ ]

12. Has it been determined that in lieu of a new MOS you may need to add an ASI or SQI for the:

	YES	NO	UNK	N/A
a. Operator?	[ ]	[ ]	[ ]	[ ]
b. Maintainer?	[ ]	[ ]	[ ]	[ ]
c. Repairer?	[ ]	[ ]	[ ]	[ ]

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAGE  
TOTALS:

13. Is the distribution of quality of soldiers (SSC-NCR Handbook) and how it impacts on the proposed system understood for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

14. Has the expected mental category distribution been considered in system design?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

15. Have the knowledge, skills and abilities available in the recruiting/expected conscription population been identified/documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

16. Is the proposed system designed for the expected population?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

17. Has the percentage of female operators, maintainers or repairers been identified/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

18. Has the impact of female assignment policies on the proposed system been determined/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

19. Have the knowledge, skills and abilities the proposed system demands been considered for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

20. Have the reading-level-capability requirements been determined/documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

21. Have all ASI associated with MOS in the proposed system been determined/documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

PAGE  
TOTALS:

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22. Has a duty description for different skill levels of each MOS been prepared?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

23. Have security clearance requirements been determined/documented for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

24. Has the impact of the high school graduate to GED/non-high school graduate ratio been determined for the:

a. Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

b. Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

c. Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

25. If there is no predecessor for the proposed system, have civilian occupational descriptions been reviewed to obtain pertinent knowledge, skills and abilities (Dictionary of Occupational Titles Manual and AR 611-201)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

26. Has the requirement to continuously update and maintain personnel data information for the proposed system been determined/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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PAGE  
TOTALS:

27. Has the impact of the proposed system on the personnel replacement system been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

28. Has the target audience that will operate, maintain and repair the proposed system been determined/documented?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

29. Can the target audience operate, maintain and repair the proposed system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

CHAPTER 4

PERSONNEL TOTALS

PAGE 4-2

PAGE 4-3

	YES	NO	UNK	N/A
PAGE 4-4	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 4-5	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 4-6	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 4-7	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 4-8	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
CHAPTER 4 TOTAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CHAPTER 5

### TRAINING

5.1 Training refers to the instruction necessary to impart the requisite knowledge, skills, and abilities to qualified Army personnel in order for them to be able to accomplish the job specific skills (as coded on TOE/TDA documents) as required by their duty position.

5.2 Your answers to the following questions should assist in the assessment of the Training Domain:

TRAINING GOAL :  
PREDICT AND REDUCE  
THE TRAINING BURDEN

1. Has a training strategy that is adequate and attainable been identified? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. Has a training plan that takes advantage of currently established and effective predecessor system training plans been identified? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Have critical training tasks for the new system been identified? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Has the impact on personnel training been considered for:  
Officers? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Warrants? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Enlisted? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Civilian? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

5. For the different types of personnel (Officer, Warrant, Enlisted, Civilian), has it been considered whether the new system can be operated/maintained/ repaired by the existing:

(Warrant/Enlisted) - MOSs, ASIs and SQIs? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

(Civilian) - Knowledge, Skills and Abilities? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

(Officer) - Branch Areas of Concentration and Skills? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

\_\_\_\_\_  
PAGE 5-2 TOTALS: YES NO UNK N/A  
☐ ☐ ☐ ☐

6. Has a Training Effectiveness Analysis (TEA) been conducted? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

7. Can the new system be fielded without the requirement for a NETT? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

8. Will the proposed system have an impact on Common Task Training (CTT)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

9. Have training devices (eg, the Weaponeer) been planned for to reinforce skills learned or to aid in training? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

10. Have requirements for simulators/  
training devices been considered:

In sufficient quantity? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

The correct model? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Required manufacturing lead time? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Any maintenance needs? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

11. Will the proposed system incorporate imbedded training? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Has a learning analysis been started/conducted to determine the knowledge, skills and abilities a soldier is required to have to perform on the proposed system? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

5-3 PAGE  
TOTALS:

☐ ☐ ☐ ☐

13. Has the Target Audience Description (TAD) been used to help in planning the appropriate level of training?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

14. Have the optimal locations for training (basic training, advanced training, formal training, correspondence course training, On-the-Job Training (OJT)) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

15. Has the impact of budgetary constraints on providing any new/additional training (instructor/cadre, billeting, transportation, meals and installation support) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

16. Has the impact on retention and recruiting that any new training might impart been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

17. Has personnel flow through the Trainees, Transients, Holders and Students (TTHS) account (and its impact on training) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

18. Have the requirements for acceptance into/completion of training (eg, mental, physical, security, language, skills) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

19. Has the training impact upon the personnel population density (eg, career progression, new equipment ramp-up, training transition bubble) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

☐ ☐ ☐ ☐

20. Have related personnel training documents been reviewed?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

21. Has the required training impact on the total force (RA/AR/NG) and on mobilization (IRR/MOBDES) been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

22. The proposed new system will not operate in isolation within the Department of the Army. As part of the "big picture," has the total implementation of operators/repairers/maintainers been considered in order to prevent skill erosion and skill creep?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

CHAPTER 5  
TRAINING TOTALS

	YES	NO	UNK	N/A
PAGE 5-2	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 5-3	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 5-4	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 5-5	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
CHAPTER 5 TOTAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CHAPTER 6  
SYSTEM SAFETY

6.1 System safety is defined as "freedom from those conditions that can cause death, injury, occupational illness or damage to or loss of equipment or property." The basic policy is established by AR 385-16. The DCSPER is the proponent for system safety and the U.S. Army Safety Center at Ft. Rucker is the DCSPER's executive agent. Additional information is available in DA Pam 385-16 and MIL-STD-882A.

6.2 Your answers to the following questions should assist in the assessment of the System Safety Domain:

SYSTEM SAFETY GOAL :  
PRECLUDE ACCIDENTS

1. Are the basic references (AR 385-16, DA Pam 385-16, MIL-STD-882) available? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. If a predecessor/reference system exists, are the following sources of data available:

Safety related Modification Work Orders (MWO)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Safety related Equipment Improvement Reports (EIR)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Safety of Use/Flight Messages/Accident reports/analyses (also for functionally similar equipment)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Applicable OSHA (Occupational Safety and Health Act), DOT (Department of Transportation), FAA (Federal Aviation Administration), EPA (Environmental Protection Agency) regulations? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Is a qualified systems safety engineer available? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Are personnel in your organization experienced or familiar with the System Safety Assessment process? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

5. Has an accident risk assessment summary been completed? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

6. Have the system safety risks associated with the following power sources, which may be present in the system, been considered:

Mechanical (internal combustion engine, gears, chains)?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Electrical (radio, radar, laser)?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Hydraulics, pneumatics?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Chemical, explosive, propellants, etc.?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

7. Have the system safety risks associated with the following pieces of equipment, which may be present on your system, been considered:

Exposed, moving equipment?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
RF/MW antenna?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Hazardous materials or by-products?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Combustion processes?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
High temperature devices?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Vehicular movement/Flight?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Gun systems?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]
Missile systems?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

8. Have design requirement statements been developed to address or prevent the impact or consequences of:

Catastrophic loss of the of the system or the soldier(s) due to failure of a component or procedural error/omission?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Operational loss of the system or disabling soldier injury due to component failure, malfunction or procedural error/omission?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Loss of system effectiveness or soldier injury due to component malfunction or procedural error/omission?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

9. Are all trade-offs or impact issues considered for their effects on all other MANPRINT domains as well as system cost and performance requirements?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

10. Are all functional, cost and performance data as well as assumptions and other pertinent criteria consistent with all other analyses being performed on the system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

11. Is the system safe for the soldier to operate, maintain and repair?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Are all functional relationships, criteria and assumptions checked for sensitivity over all reasonable value ranges?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

13. For any significant deviations in the sensitivity range, are the deviations identified for future analysis and evaluation?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

14. Do sensitivity analyses consider simultaneous changes in variables etc. as well as isolated changes?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

CHAPTER 6  
SYSTEM SAFETY TOTALS

	YES	NO	UNK	N/A
PAGE 6-2	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 6-3	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 6-4	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 6-5	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
CHAPTER 6 TOTAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CHAPTER 7

### HEALTH HAZARD

7.1 A health hazard is defined as "an existing or likely condition inherent to the operation or use of materiel that can cause death, injury, acute or chronic illness, disability and/or reduced job performance of personnel due to:

- a. acoustical energy;
- b. biological substances (pathogenic micro-organisms and sanitation);
- c. chemical substances (weapons/engine combustion products and other toxic matter);
- d. oxygen deficiency (crew/confined spaces and high altitude);
- e. radiation energy (ionizing/non-ionizing to include lasers);
- f. shock (acceleration and deceleration);
- g. temperature extremes and humidity (heat and cold injury);
- h. trauma (blunt/sharp instruments including muscular/skeletal);
- i. vibration (whole body and segmental)."

7.2 AR 40-10 establishes policy for health hazards. The proponent is the Surgeon General.

7.3 Your answers to the following questions should assist in the assessment of the Health Hazard Domain:

HEALTH HAZARDS GOAL :  
MINIMIZE HEALTH HAZARDS

1. Are the basic references (eg, AR 40-10, MIL-STD-882A, etc.) available? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. If a predecessor/reference system exists, are the following sources of data available:

Health related Modification Work Orders (MWO)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Health related Equipment Improvement Reports (EIR)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Health related Product Improvements (PIP)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Accident reports/analyses, (also for functionally similar equipment)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Applicable OSHA (Occupational Safety and Health Act), DOT (Department of Transportation), FAA (Federal Aviation Administration), EPA (Environmental Protection Agency), regulations? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Current Health Standard Data Item Descriptions? (The Surgeon General is the proponent.) YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Current Health Assessment Test Operating procedures? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Current Personnel Exposure Limits/Threshold values as developed by the Surgeon General? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Is qualified support available from the Preventative Medicine section of the supporting AMEDD activity? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Has a Health Hazard Assessment (HHA) been planned? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

5. Are personnel in your organization experienced or familiar with the Health Hazard Assessment process?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

6. Have the Health Hazards associated with the following items which may accompany the operation, maintenance or repair of the system been considered?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Acoustical energy, steady state & impulse?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Biological substances; waste, toxins, biological agents?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Chemical substances; liquids, vapors, solids, particulates?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Oxygen deficient conditions, high altitude or closed spaces?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Radiation, ionizing and non-ionizing?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Shock (acceleration/deceleration, functional/accidental)?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Temperature & Humidity of the:

System and subsystems?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Environment?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Range of values?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Trauma, blunt, sharp & musculoskeletal?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Vibration, whole body & segmental?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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PAGE  
TOTALS:

7. Have design requirement statements been developed to address or prevent the impact or consequences of exposure to hazards during operations, maintenance or repairs from:

The system itself?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Associated equipment?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

8. Have design requirement statements been developed to reduce the risk of any item or situation/procedure with Risk Assessment Code (REF MIL-STD-882A) of 1, 2 or 3?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

9. Have design requirement statements been developed to eliminate the risk of any item or situation/procedure with residual Risk Assessment Code of 4 or 5?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

10. Does this system pose a health hazard to the soldier?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

11. Are all trade-offs or impact issues considered for their effects on all other MANPRINT domains as well as system cost and performance requirements?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Are all functional, cost and performance data as well as assumptions and other pertinent criteria consistent with all other analyses being performed on the system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

13. Are all functional relationships, criteria and assumptions checked for sensitivity over all reasonable value ranges?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

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14. For any significant deviations in the sensitivity range, are the deviations identified for future analysis and evaluation?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

15. Do sensitivity analyses consider simultaneous changes in variables etc. as well as isolated changes?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

CHAPTER 7  
HEALTH HAZARDS TOTALS

PAGE 7-2

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

PAGE 7-3

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

PAGE 7-4

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

PAGE 7-5

YES	NO	UNK	N/A
[ ]	[ ]	[ ]	[ ]

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CHAPTER 7 TOTAL

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CHAPTER 8

### HUMAN FACTORS ENGINEERING

8.1 Human Factors Engineering (HFE) is defined as a comprehensive technical effort to integrate human factors qualitative and quantitative information into doctrine, materiel development, and materiel acquisition to insure operational effectiveness. This information includes:

- a. human characteristics;
- b. operator/maintainer capability requirements;
- c. soldier performance data;
- d. anthropometric data;
- e. biomedical factors;
- f. safety factors;
- g. training factors;
- h. manning implications;
- i. system interface requirements.

8.2 MIL-STD-1472 is a basic reference establishing the criteria for HFE. The Human Engineering Laboratory (HEL) at Aberdeen Proving Ground, a part of the U.S. Army Laboratory Command, is the agency responsible for HFE in the U.S. Army. This is accomplished through Human Factors Engineering Analysis (HFEA), conducted by HEL and the various HEL field offices. Consideration of HFE factors by the combat developer early in the development phase will help in successfully integrating MANPRINT principles into the system's development.

8.3 Your answers to the questions below should assist in the assessment of the Human Factors Engineering Domain:

HUMAN FACTORS ENGINEERING GOAL :  
PREDICT WORKLOAD AND PERFORMANCE

1. Is Human Engineering Laboratory or HEL Field Unit support available? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

2. Are MIL-STD-1472 or DOD HDBK (handbook) 743 or MIL-HDBK (handbook) 759 or similar references available? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

3. Is the HEL support office playing an active role in system development? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

4. Have HFE tasks, concerns and questions to be resolved been developed in the SMMP? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

5. If a predecessor system/reference component set exists, is information available on:

HFE related Modification Work Orders (MWO)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

HFE related Product Improvement Program (PIP)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

HFE related after action/lessons learned topics? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

6. Is the human/system interface well defined for the:

Operator? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Maintainer? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Repairer? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Others (eg, passengers, patients, etc)? YES NO UNK N/A  
[ ] [ ] [ ] [ ]

YES NO UNK N/A

☐ ☐ ☐ ☐

7. Has HFE been addressed in the ROC and O & O?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

8. Have all required functions of the system been identified and stated:

Those required by the mission needs?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Those implied due to human interface?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Those that are desireable or system enhancing (without adding "gold plating")?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

9. Have human performance capabilities and limitations pertaining to the system been identified and specified for the psychological criteria:

Memory?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Learning and retention?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Sensory discrimination?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

10. Have human performance capabilities and limitations pertaining to the system been identified and specified for the physiological criteria:

Strength and endurance?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Stress and sensory sensitivity?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

Biomechanical performance?	YES	NO	UNK	N/A
	[ ]	[ ]	[ ]	[ ]

_____	YES	NO	UNK	N/A
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Have human anthropometric dimensions been considered in the design of the system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

12. Have human performance capabilities and limitations pertaining to the system been identified and specified for the social needs criteria:

Leadership?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Communication?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Attitudinal needs?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

13. Have design requirement statements been developed to address or prevent the impact or consequences of the following sources of human error:

Aptitude, performance, learning?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Motivation, carelessness?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Training shortfalls?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Lack of task aids, feedback devices?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

14. Have design requirement statements been developed to address or prevent the impact or consequences of the requirement to redistribute the workload due to casualties or need for rest?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

15. Have design requirement statements been developed to address or prevent the impact or consequences of incorporating technology at the expense of:

	YES	NO	UNK	N/A
Mission effectiveness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliability?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human workload and cognitive limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Have design requirement statements been developed to insure effective placement of the human in the feedback/control loop to optimize the strengths of the human/machine system?

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Have the task sequence loops been analyzed for the probable modes and frequency of failure for:

	YES	NO	UNK	N/A
Operators?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintainers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repairers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Have the least reliable human functions been identified?

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Has the degree of system performance degradation resulting from fatigue or stress on the part of the human component been identified?

YES	NO	UNK	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Does the system design promote efficient and effective operator and maintainer performance of critical tasks?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

21. Can the operator perform all required tasks in the prescribed manner while wearing MOPP gear or other special equipment that may be required?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

22. Has the degradation of human performance in an NBC environment been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

23. Has the acceptable degradation of system performance in an NBC environment been identified?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

24. Have the secondary tasks that must be performed been identified for the:

Operator?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Maintainer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

Repairer?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

25. Have acceptable human reliability and performance requirements been determined?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

26. Have the human reliability and performance requirements made a proper contribution to total system performance requirements?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

27. Do the key members of the organization understand the difference between human reliability and human performance?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

28. Are all trade-offs or impact issues considered for their effects on all other MANPRINT domains as well as system cost and performance requirements?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

29. Are all functional, cost and performance data as well as assumptions and other pertinent criteria consistent with all other analyses being performed on the system?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

30. Has an HFEA been planned?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

31. Was an HFE lessons learned document used as a partial basis for the initial RFP?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

32. Have human factors data item descriptions been included in the SOW?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

33. Have Human Factors Engineering issues been addressed in the TEMP?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

34. Are the HFE criteria in the TEMP measurable?

YES NO UNK N/A  
[ ] [ ] [ ] [ ]

## CHAPTER 8

### HUMAN FACTORS ENGINEERING TOTALS

	YES	NO	UNK	N/A
PAGE 8-2	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 8-3	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 8-4	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 8-5	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 8-6	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
PAGE 8-7	[ ]	[ ]	[ ]	[ ]

	YES	NO	UNK	N/A
CHAPTER 8 TOTAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## CHAPTER 9

### ASSESSMENT SUMMARY

9.1 The purpose of the summary is to provide graphic representations of the assessment results. These can serve as indicators of information needs or potential problem areas. The assessment can also be used as a framework for the breakdown of the system into simpler issues which may be more easily dealt with than the system as a whole. Many of the issues identified in this assessment may be areas of concern which should also be addressed in the SMMP. Progress in gathering of data/information and the resulting reduction in the amount of uncertainty as well as the classification of the issues can be tracked using the summary procedures.

9.2 The assessment does have some limitations since it is not intended to be a rigorous analytical technique. A graphical depiction is used for the summary since the use of a numerical index or score is inconsistent with the nature of the data used.\* In general, numerical significance should not be attached to elements of the summary.

9.3 The process consists of totaling the number of questions by page and then by chapter. These totals are transferred to the work sheets which follow. On these worksheets the percentage of each category of answer for each chapter and for the assessment aggregate is calculated. From these percentages a chart is prepared using figure 9-1. Figure 9-2 gives an example of a summary for a hypothetical system early in the development process. The chart is a stacked column chart, with a separate column for each domain as well as an aggregate or system average column. Each column is composed of three sub-columns stacked end to end. The height of the bottom sub-column represents the percentage of "UNK" answers, the middle column representing the percentage of "NO" answers and top sub-column the percentage of "YES" answers for each respective domain. Added together they sum to 100%, representing all the applicable answers given for the domain.

\*The data gathered by the Risk Assessment is of a nominal or ordinal type, neither of which yields valid numeric operations.

9.4 Recalling from Chapter one that "UNK" (unknown) answers represent the greatest degree of risk, followed by "NO" and then "YES" answers respectively, the worst case situation would be one in which the percentage of "UNK" answers equals 100%. The best case being one in which there were 100% "YES" answers. In reality one should expect a situation between the two extremes. Using the completed summary chart, the user can visually assess the status of the system, by domains and as a whole. A high percentage of "UNK" indicates a general lack of information about the system, pointing to a need to gather data. A high percentage of "NO" answers suggests that consideration and attention should be given to further analysis, possible redesign or the use of alternative approaches to insure optimum adherence to MANPRINT principles. A high percentage of "YES" answers represents a general adherence to MANPRINT principles and the preferred result. It must be remembered that this procedure cannot remove all risk, especially risk possible from the synergy which may be produced by combining the different components or risk of the physical or economic inability to implement the system features required to satisfy all MANPRINT principles.

9.5 If the assessment is repeated several times during the concept formulation and MANPRINT integration process, the chart should show progress in reducing the percentages of "UNK" answers toward zero and reduction of "NO" answers to some minimum amount.

## CHAPTER 2, SYSTEM

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	<input type="text"/>	<input type="text"/>	- <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	< <input type="text"/>
MULTIPLIED BY 100	X100	X100	X100	
EQUALS	<input type="text"/>	<input type="text"/>	<input type="text"/>	
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 3, MANPOWER

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	<input type="text"/>	<input type="text"/>	- <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	< <input type="text"/>
MULTIPLIED BY 100	X100	X100	X100	
EQUALS	<input type="text"/>	<input type="text"/>	<input type="text"/>	
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 4, PERSONNEL

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	+	<input type="text"/>	+
	<input type="text"/>	+	<input type="text"/>	-
	<input type="text"/>		<input type="text"/>	<input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 5, TRAINING

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	+	<input type="text"/>	+
	<input type="text"/>	+	<input type="text"/>	-
	<input type="text"/>		<input type="text"/>	<input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 6, SYSTEM SAFETY

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	+	<input type="text"/>	+
	<input type="text"/>		<input type="text"/>	- <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 7, HEALTH HAZARDS

THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
	<input type="text"/>	+	<input type="text"/>	+
	<input type="text"/>		<input type="text"/>	- <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

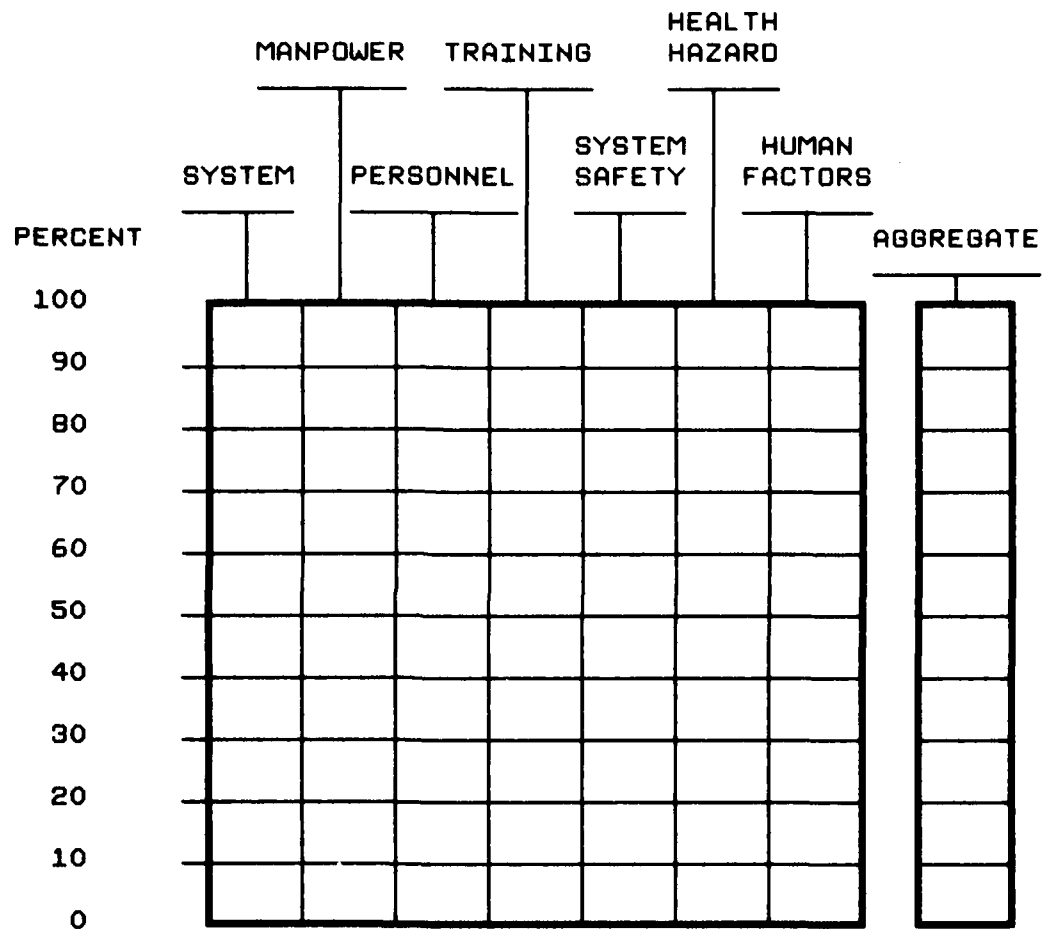
## CHAPTER 8, HUMAN FACTORS ENGINEERING

				SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	
	<input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	= <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<—
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

## CHAPTER 9, ASSESSMENT SUMMARY: AGGREGATE PERCENTAGES

				SUMMED TO GIVE TOTAL NUMBER OF ANSWERS GIVEN
THE QUANTITY OF EACH ANSWER	# YES	# NO	# UNK	
	<input type="text"/>	+ <input type="text"/>	+ <input type="text"/>	= <input type="text"/>
THE QUANTITY OF EACH ANSWER THEN DIVIDED BY THE TOTAL,	<input type="text"/>	<input type="text"/>	<input type="text"/>	<—
MULTIPLIED BY 100	X100	X100	X100	
EQUALS				
THE PERCENT OF EACH ANSWER	% YES	% NO	% UNK	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	

FIGURE 9-1  
SUMMARY GRAPH



LEGEND\*

PERCENT YES - (TOP COLUMN)

☐

PERCENT NO - (MIDDLE COLUMN)

☐

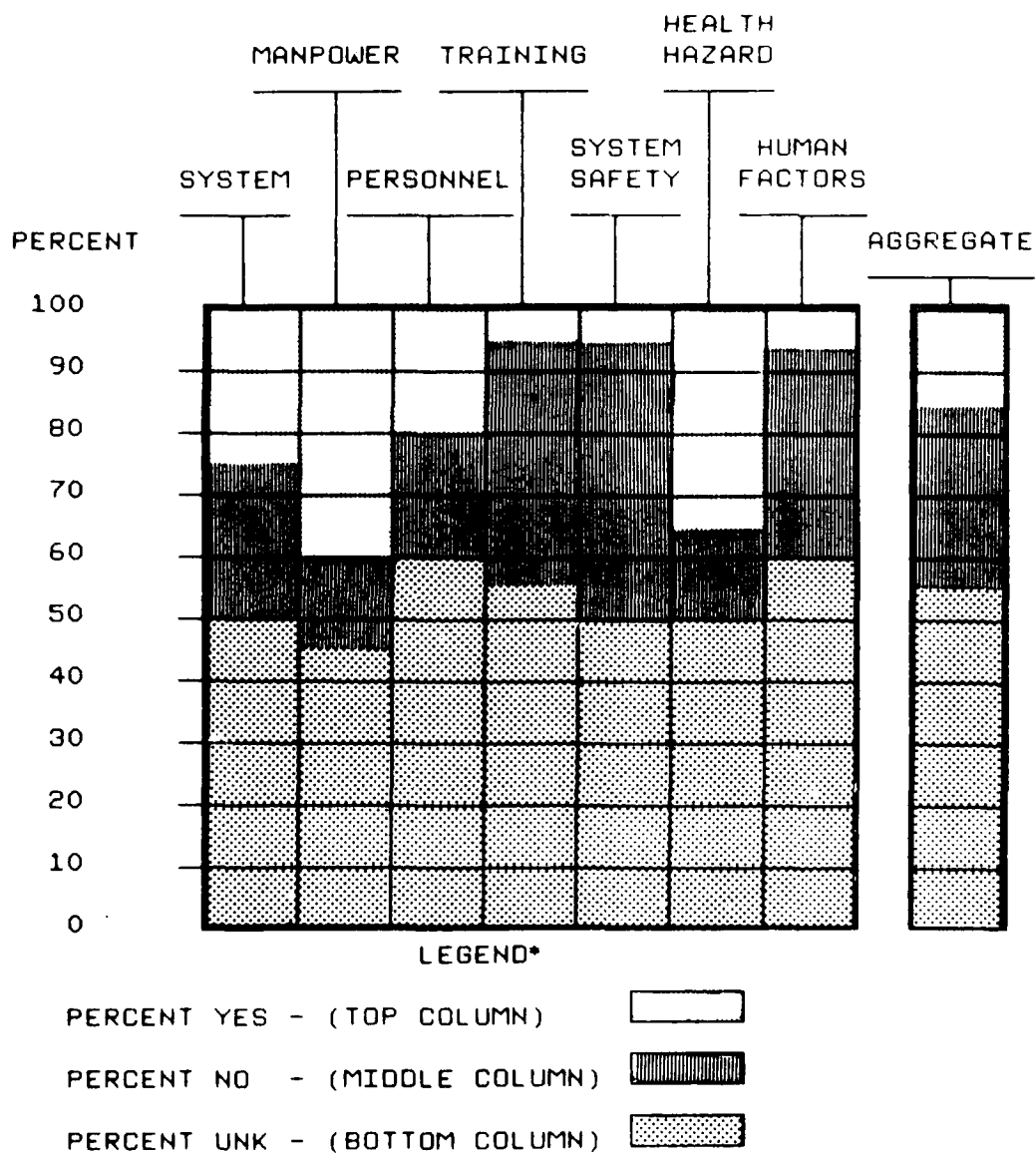
PERCENT UNK - (BOTTOM COLUMN)

☐

\* INDICATE COLOR CODING OR OTHER DIFFERENTIATION SCHEME IN BLANKS

FIGURE 9-2

EXAMPLE SUMMARY GRAPH



This graph might represent a system very early in the concept phase. All domains have a significant number of unknowns indicating a need for a great deal of data. Of the questions that had known answers, the manpower and health answers appear relatively strong. The other areas present significant manpower problems that must be addressed, particularly training, system safety and human factors.

\* INDICATE COLOR CODING OR OTHER DIFFERENTIATION SCHEME IN BLANKS

## APPENDIX A

### REFERENCES AND SELECTED READING MATERIAL

#### DIRECTIVES

Federal Acquisition Regulation

Defense Federal Acquisition Regulation Supplement

Army Federal Acquisition Regulation Supplement

OMB Circular A-109 (Major Systems Acquisition)

#### ARMY REGULATIONS

AR 15-14	Systems Acquisition Review Council Procedures
AR 40-10	Health Hazard Assessment Program in Support of the Army Material Acquisition Decision Process
AR 70-1	Systems Acquisition Policy and Procedures
AR 70-8	Personnel Performance and Training Program (PPTP)
AR 70-10	Test and Evaluation During Development and Acquisition of Material
AR 70-15	Product Improvement of Material
AR 70-17	System/Program/Project/Product Management
AR 70-25	Use of Volunteers as Subjects of Research
AR 70-61	Type Classification of Army Material
AR 71-2	Basis of Issue Plans (BOIP), Qualitative and Quantitative Personnel Requirements Information (QQPRI)
AR 71-3	User Testing
AR 71-9	Material Objectives and Requirements
AR 310-49	The Army Authorization Document System
AR 350-6	Army-Wide Small Arms Competitive Workmanship

AR 350-35	Army Modernization Training
AR 350-38	Training Device Policies and Procedures
AR 381-11	Threat Support to U.S. Army Force, Combat and Material Development
AR 385-16	Systems Safety Engineering and Management
AR 570-1	Commissioned Officer Aviation Position Criteria
AR 570-2	Organization and Equipment Authorization Tables Personnel
AR 570-4	Manpower Management
AR 570-5	Manpower Staffing Standards System
AR 602-1	Human Factors Engineering Program
AR 602-2	Manpower and Personnel Integration (MANPRINT) in Material Acquisition Process
AR 611-101	Commissioned Officer Specialty Classification System
AR 611-112	Manual of Warrant Officer Military Occupational Specialties
AR 611-201	Enlisted Career Management Fields and Military Occupational Specialties
AR 700-127	Integrated Logistics Support
AR 700-129	Integrated Logistics Support Management of Multi-Service Communications-Electronics Systems and Equipment
AR 702-3	Army Material Systems Reliability, Availability, and Maintainability (RAM)
AR 702-9	Production Testing of Army Material
AR 715-6	Proposal Evaluation and Source Selection
AR 750-1	Army Material Maintenance Concepts and Policies
AR 750-37	Sample Data Collection: The Army Maintenance Management System

AR 1000-1      Basic Policies for Systems Acquisition

CHIEF OF STAFF REGULATIONS (CSR)

11-2            Research and Development Cost Guide

11-3            Investment Cost Guide for Army Material  
                 Systems

11-4            Operation and Support Cost Guide for Army  
                 Material Systems

11-5            Standards for Presentation and Documentation  
                 of Life Cycle Cost Estimates

11-15          The Army Long-Range Planning System

71-3           Operational Testing and Evaluation Methodology  
                 and Procedure Guide

DA PAMPHLETS

5-25           Army Modernization Information Memorandum  
                 (AMIM)

11-25          Life Cycle System Management Model for Army  
                 Systems

385-16        System Safety Management Guide

700-127       Integrate Logistics Support (ILS) Manager's  
                 Guide

DA CIRCULAR

600-82-2      The New Manning System

AMC/TRADOC PAM

70-2           Material Acquisition Handbook

70-7           Nondevelopment Item (NDI) Acquisition

TRADOC REGULATIONS

11-7           Operational Concepts and Army Doctrine (ATRM)

11-9           TRADOC Development and Acquisition Priorities

71-9           User Test and Evaluation

71-12	TRADOC System Manager (TSM)
350-4	The TRADOC Training Effectiveness Analysis (TEA) System
350-7	A Systems Approach to Training
350-15	TRADOC Training Evaluation, Standardization and Feedback Program
351-1	Training Requirements Analysis System
351-9	Individual and Collective Training Plan for Developing Systems Policy and Procedure

TRADOC CIRCULAR

602-XXX	MANPRINT
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ADDITIONAL PUBLICATIONS

DCSPER	MANPRINT, A Selective Bibliography
DCSPER	MANPRINT PRIMER (Draft)
DCSPER	MANPRINT In The Source Selection Process (Third Draft)
SSC-NCR	Distribution of Quality Program Handbook
SSC-NCR	Early Comparability Analysis (ECA) Procedural Guide
SSC-NCR	Guidelines For Preparing Enlisted MOS Specifications
SSC-NCR	MANPRINT On-Line
SSC-NCR	System MANPRINT Management Plan (SMMP) Procedural Guide
SSC-NCR	Target Audience Description
ARI/ SSC-NCR	HARDMAN Comparability Analysis Methodology Guide - Vols I thru V
MILPERCEN	Force Management Books I and II
USABSC FC 21-451	I Am The American Soldier
Vol I&II	MANPRINT Staff Officer Course Guides

## APPENDIX B

### SELECTED MANPRINT INFORMATION

#### B.1 THE MANPRINT PROGRAM (extracted from AR 602-2)

1. MANPRINT refers to the comprehensive management and technical effort to assure total system effectiveness by continuous integration into materiel development and acquisition of all relevant information concerning the following:

- a. Manpower
- b. Personnel
- c. Training
- d. System Safety
- e. Health Hazard
- f. Human Factors Engineering

2. The philosophy of the MANPRINT Program is to have the Army and industry take necessary actions to answer the question: Can this soldier with this training perform these tasks to these standards under these conditions?

3. Some MANPRINT examples include (but are not limited to) the following:

a. Integrating all actions in the materiel acquisition process affecting human performance and reliability. This includes manpower levels, personnel requirements, training requirements and methods (including training devices), system safety, health hazards and human factors engineering.

b. Developing equipment that will permit effective soldier-materiel interaction within the established performance limits, training time, soldier aptitudes and skills, physical capabilities, and physiological tolerance limits.

c. Determining and evaluating requirements for overall system performance requirements based upon capabilities and limitations of soldier performance.

d. Developing and applying methodologies to analyze manpower levels, personnel, training, system safety, health hazard and human factors engineering issues in an integrated manner.

e. Developing, maintaining, and using data bases containing manpower, personnel, training, system safety, health hazards and human factors engineering information.

4. Some of the objectives of the MANPRINT program are to:

a. Influence soldier-materiel system design for optimum total system performance by considering human performance and reliability issues related to manpower, personnel, training, system safety, health hazards and human factors engineering before making a functional allocation of tasks among people, hardware, and software.

b. Ensure that Army materiel systems and concepts for their employment conform to the capabilities and limitations of the fully equipped soldier to operate, maintain, supply, and transport the materiel in its operational environment consistent with tactical requirements and logistic capabilities.

c. Assist the Army trainer in determining, designing, developing, and conducting sufficient, necessary, and integrated Army and joint service training.

d. Improve control of the total life-cycle costs of soldier-materiel systems by ensuring consideration of the costs of personnel resources and training for alternative systems during the conceptual stages and for the selected system during subsequent stages of acquisition.

e. Ensure thorough studies and analyses and basic and applied research (human factors engineering; soldier-materiel system analysis; and experimental, physiological, and psycho-physical psychology) that equipment designs and operational concepts are compatible with the limits of operators and maintainers defined in the target audience description.

f. Develop a unified, integrated MANPRINT data base to define ranges of human performance. Compare these ranges against system performance and provide for the timely development of trained personnel.

g. Provide MANPRINT data for the development of technical manuals, training manuals, field manuals, and other training media and technical publications. Ensure that the use of these publications does not require aptitudes, education, or training beyond the requirements set to perform the tasks they describe.

h. Apply MANPRINT concepts and current educational technology to analysis, design, and development of training devices.

i. Integrate combat development and technology base information systems with personnel long-range planning.

B.2 HARDMAN COMPARABILITY METHODOLOGY (HCM) (extracted from ARI/SSC-NCR HARDMAN Comparability Analysis Methodology Guide, Vols I thru V)

1. The HARDMAN Comparability Methodology (HCM) is a MANPRINT methodology that estimates the manpower, personnel pipeline and training requirements of conceptualized materiel systems.

2. HCM is based on comparability analysis. This means that components from the existing DOD inventory are selected to represent the components likely to be found on the new system. The components are selected to be "comparable" in function and performance to those required on the new system. The list of these components is called the Baseline Comparison System (BCS). Manpower, personnel pipeline and training requirements data from BCS components is analyzed, aggregated, and processed (using standard HCM data analysis methods) to create an extensive set of data that describes the likely quantitative manpower, personnel pipeline and training requirements of the new system.

3. In addition to the BCS data set, HCM also produces a second set of data which is based on modifications to the BCS. The purpose of the modifications is to reflect differences between the BCS components, and the specific technologies and designs that are planned for the new system. This set of data is termed the "proposed system" data, and is based on a "fair broker" assessment of the principle design features and technology planned for the new system. A third data set prepared during HCM is the "predecessor system". This data shows the manpower, personnel pipeline and training requirement "footprint" of the system that will be replaced (if any). Since the predecessor system data is prepared using the same basic methods used for the BCS and the proposed system, the predecessor data provides a benchmark for evaluating the difference between manpower, personnel pipeline and training requirement levels now in effect and those that will be in effect when the new system is fielded.

4. The US Army Soldier Support Center - National Capital Region (USA SSC-NCR) is the TRADOC executive agent for HCM. As such, USA SSC-NCR has arranged for contracting mechanisms to conduct HCM and has consummated an agreement with the US Army TRADOC Analysis Command - White Sands Missile Range. TRAC will be conducting HCM in-house.

5. HCM is a dynamic methodology that is being modified (by a product improvement) and automated (by development of "Man Integrated Systems Technology (MIST)) by the US Army Research Institute.

B.3 EARLY COMPARABILITY ANALYSIS (ECA) (extracted from SSC-NCR Early Comparability Procedural Guide)

1. An Early Comparability Analysis (ECA) is a MANPRINT methodology developed by the US Army Soldier Support Center - National Capital Region (USA SSC-NCR). An ECA has the following purposes:

a. Provide a tool for MANPRINT action officers to establish specific tasks performed by soldiers as a common language for system design.

b. Identify predecessor or comparable system tasks and potential new system tasks costly in manpower, personnel and training resources ("high drivers").

c. Limit "high drivers" in the design/development of new and/or product improved systems.

2. An ECA may be useful in the materiel acquisition process when:

a. Pre-O & O plan: The ECA can identify "high driver" tasks to be resolved, provide initial target audience description data, and develop initial manpower, personnel and training constraints.

b. Pre-Milestone I: The ECA can feed LSA, LOA, LR, Tentative ROC, Tentative QQPRI, ICTP, TEMP, etc.

c. Pre-Milestone II/III: The ECA can identify "high driver" tasks, as part of the operational/technical testing of prototypes, that must be resolved in subsequent modifications (the prototype becomes the predecessor).

d. Post-Fielding: The ECA can help identify "high driver" tasks that should be resolved by product improvement and helps identify near-term manpower, personnel and/or training solutions to those problem tasks.

3. The ECA helps preclude a repeat of old "mistakes" but it does not preclude all new "mistakes". It does not address collective tasks, supervisory/managerial tasks, safety, nor health hazards. It is a relatively fast, inexpensive means of analyzing meaningful manprint data that has significance to a myriad of manprint agencies.

**B.4 TRAINING EFFECTIVENESS ANALYSIS (TEA) METHODOLOGY**  
(extracted from TRASANA Pamphlet 350-4, dated August 1985)

1. TRADOC Regulation 350-4 defines the two types of TEAs:

- a. Developmental Training Effectiveness Analysis (DTEA)
- b. Post Fielding Training Effectiveness Analysis (PFTEA)

2. A DTEA focuses on systems in the developmental phases (or pre-Initial Operational Capability (IOC)); a PFTEA assesses systems already fielded.

3. DEVELOPMENTAL TRAINING EFFECTIVENESS ANALYSIS (DTEA)  
DTEA are conducted to assess the ability to support training and/or to identify training requirements for developing hardware systems. There are four subtypes of DTEA, each intended to support decisions at the completion of specific phases in the US Army Materiel Acquisition Process.

a. The Preliminary TEA (PTEA) contributes to the formulation of training strategies for a new hardware system or as a part of a product improvement program. PTEA results support decisions at the end of the concept exploration phase of system development. Factors in the analysis include requirements on the ability to train, problems associated with system technological complexity, relationships between individual aptitudes and potential training alternatives, and the availability of personnel.

b. The Cost and TEA (CTEA) is a detailed comparison of the costs and effectiveness of training alternatives proposed for a developing hardware system. The CTEA identifies the most efficient training strategy by assessing levels of proficiency attained by the trainees and the associated costs of feasible training alternatives. This type of analysis supports decisions at the completion of the demonstration and validation phase of system development and is required by TRADOC Regulation 350-4.

c. The CTEA Update is a follow-on to the CTEA and uses data collected during operational testing to assess a training program as implemented including evaluation of soldier manuals, trainer guides, and programs of instruction. The update should be conducted prior to the full scale development phase of the materiel acquisition process.

d. The Training Developments Study (TDS) evaluates training devices or simulators proposed as part of the training program for a developing system. The TDS assesses the effectiveness of a device or simulator and how it may be incorporated into a training program. A TDS is also required by TRADOC Regulation 350-4.

#### 4. POST FIELDING TRAINING EFFECTIVENESS ANALYSIS (PFTEA)

The PFTEA is conducted after IOC and when the product has been provided to field units. The focus of the PFTEA is an assessment of individual and crew proficiency in an effort to determine the effectiveness of unit training. The PFTEA is designed to provide feedback to the participating units, to TRADOC, and to the Army concerning institutional and unit training and their strengths and weaknesses.

#### 5. COST EFFECTIVENESS ANALYSIS (COEA)

A COEA is conducted to determine which system to select from several alternatives, based upon cost. All costs are considered over the total life cycle of the vehicle for each alternative in an attempt to establish a relative cost relationship among the alternatives.

#### 6. DIFFERENCE BETWEEN TEA AND COEA

It is important to clearly distinguish between a TEA and a COEA. The TEA focuses on the alternatives among training subsystems while the COEA considers all costs associated with the materiel system. For additional information on TEA Methodology, contact Mr DALE DANNHAUS at TRAC W8MR, AUTOVON 258-5915.

## APPENDIX C

### SELECTED MANPRINT ACRONYMS

AAE	ARMY ACQUISITION EXECUTIVE
AAMMH	ANNUAL AVAILABLE MAINTENANCE MAN HOURS
AAO	ARMY ACQUISITION OBJECTIVE
AFQT	ARMED FORCES QUALIFICATION TEST
AMIM	ARMY MODERNIZATION INFORMATION MEMORANDUM
AMMEDO	ARMY MEDICAL DEPARTMENT
AR	ARMY RESERVE
ASARC	ARMY SYSTEMS ACQUISITION REVIEW COUNCIL
ASE	ASSOCIATED SUPPORT EQUIPMENT
ASI	ADDITIONAL SKILL IDENTIFIER
ASIDE	ASSOCIATED SUPPORT ITEMS OF EQUIPMENT
AOSP	ARMY OCCUPATIONAL SURVEY PROGRAM
ASVAB	ARMED SERVICES VOCATIONAL APTITUDE BATTERY
BCE	BASELINE COST ESTIMATE
BCS	BASELINE COMPARISON SYSTEM
BITE	BUILT-IN TEST EQUIPMENT
BOC	BEST OPERATIONAL CAPABILITY
BOIP	BASIS OF ISSUE PLAN
BTA	BEST TECHNICAL APPROACH
CAD	COMPUTER AIDED DIAGNOSTICS
CBI	COMPUTER BASED INSTRUCTION
CD	COMBAT DEVELOPER/COORDINATING DRAFT
CE	CONCEPT EXPLORATION
COEA	COST AND OPERATIONAL EFFECTIVENESS ANALYSIS
CM	CORRECTIVE MAINTENANCE
CTEA	COST AND TRAINING EFFECTIVENESS ANALYSIS
CTP	COORDINATED TEST PROGRAM
CTT	COMMON TASK TRAINING
DAP	DESIGNATED ACQUISITION PLAN
	DESIGNATED ACQUISITION PROGRAM
DCP	DECISION COORDINATING PAPER
DIO	DATA ITEM DESCRIPTION
DOT	DEPARTMENT OF TRANSPORTATION
DQ	DISTRIBUTION OF QUALITY
DTEA	DEVELOPMENTAL TRAINING EFFECTIVENESS ANALYSIS
EA	ENVIRONMENTAL ASSESSMENT
EAD	EQUIPMENT AVAILABILITY DATE
ECA	EARLY COMPARABILITY ANALYSIS
ECP	ENGINEERING CHANGE PACKAGE
EDT	ENGINEERING DESIGN PACKAGE
EIR	EQUIPMENT IMPROVEMENT REPORTS
EPA	ENVIRONMENTAL PROTECTION AGENCY
	EXTENDED PLANNING ANNEX
ET	EMBEDDED TRAINING

FAT	FIRST ARTICLE TESTED
FEA	FRONT END ANALYSIS
FI	FORCE INTEGRATION
FOE	FOLLOW-ON EVALUATION
FS	FEASIBILITY STUDY
FSD	FULL SCALE DEVELOPMENT PHASE
FUE	FIRST UNIT EQUIPPED
GFI	GOVERNMENT FURNISHED INFORMATION
GFP	GOVERNMENT FURNISHED PROPERTY
HCM	HARDWARE VS MANPOWER COMPARABILITY METHODOLOGY
HEL	U. S. ARMY HUMAN ENGINEERING LABORATORY
HFE	HUMAN FACTORS ENGINEERING
HFEA	HUMAN FACTORS ENGINEERING ANALYSIS
HHA	HEALTH HAZARD ASSESSMENT
HHAR	HEALTH HAZARD ASSESSMENT REPORT
ICE	INDEPENDENT COST ESTIMATE
ICTP	INDIVIDUAL AND COLLECTIVE TRAINING PLAN
IE	INDEPENDENT EVALUATION
ILS	INTEGRATED LOGISTICS SUPPORT
IOC	INITIAL OPERATIONAL CAPABILITY
IPR	IN-PROCESS REVIEW
ISD	INSTRUCTIONAL DEVELOPMENTS SYSTEM
ISP	INTEGRATED SUPPORT PLAN
JMSNS	JUSTIFICATION FOR MAJOR SYSTEM NEW START
JPAM	JOINT PROGRAM ASSESSMENT MEMORANDUM
JWG	JOINT WORKING GROUP
LCC	LIFE CYCLE COSTS
LC8MM	LIFE CYCLE SYSTEM MANAGEMENT MODEL
LIN	LINE ITEM NUMBER
LOA	LETTER OF AGREEMENT
LON	LETTER OF NOTIFICATION
LR	LETTER REQUIREMENT
LSA	LOGISTICS SUPPORT ANALYSIS
LSAR	LSA RECORD
MAA	MISSION AREA ANALYSIS
MAOS	MISSION AREA DEFICIENCY STATEMENT
MAMP	MISSION AREA MATERIAL PLAN
MANPRINT	MANPOWER AND PERSONNEL INTEGRATION
MAP	MATERIEL ACQUISITION PROCESS
MARC	MANPOWER REQUIREMENTS CRITERIA
MDEP	MANAGEMENT DECISION PACKAGE
MEPSCAT	MILITARY ENTRANCE PHYSICAL STRENGTH CAPACITY TESTS
MIL-STD	MILITARY-STANDARD
MIST	MAN INTEGRATED SYSTEMS TECHNOLOGY
MJWG	MANPRINT JOINT WORKING GROUP

MOA	MEMORANDUM OF AGREEMENT
MOC	MANAGEMENT OF CHANGE
MOS	MILITARY OCCUPATIONAL SPECIALTY
MOSL	MOS LEVEL SYSTEM
MOU	MEMORANDUM OF UNDERSTANDING
MPT	MANPOWER, PERSONNEL AND TRAINING
MRA	MANPRINT RISK ASSESSMENT
MSA	MPT SENSITIVITY ANALYSIS
MSPO	MATERIEL SYSTEM PROJECT OFFICER
MTOE	MODIFIED TABLE OF ORGANIZATION AND EQUIPMENT
MTTR	MEANTIME TO REPAIR
MWO	MODIFICATION WORK ORDER
NOI	NON-DEVELOPMENT ITEM
NET	NEW EQUIPMENT TRAINING
NETT	NEW EQUIPMENT TRAINING TEAM
NMS	NEW MANNING SYSTEM
OA	ORGANIZATIONAL ASSESSMENT
OBCE	OPERATIONAL BASELINE COST ESTIMATE
OJT	ON-THE-JOB TRAINING
O&O PLAN	OPERATIONAL AND ORGANIZATIONAL PLAN
OSE	OTHER SUPPORT EQUIPMENT
OSHA	OCCUPATIONAL SAFETY AND HEALTH ACT
OTP	OUTLINE TEST PLAN
PARR	PROGRAM ANALYSIS AND RESOURCES REVIEW
PCO	PROCUREMENT CONTRACTING OFFICER
PCS	PROJECT COORDINATION SHEET
PDD	PROGRAM DIRECTIVE DOCUMENT
PDIP	PROGRAM DEVELOPMENT INCREMENT PACKAGE
PDM	PROGRAM DECISION MEMORANDUM
PHA	PRELIMINARY HAZARD ANALYSIS
PIP	PRODUCT IMPROVEMENT PROGRAM
PFTEA	POST FIELDING TRAINING EFFECTIVENESS ANALYSIS
PMAO	PERSONNEL MANAGEMENT AUTHORIZATION DOCUMENT
POM	PROGRAM OBJECTIVE MEMORANDUM
PTEA	PRELIMINARY TRAINING EFFECTIVENESS ANALYSIS
PPBES	PLANNING, PROGRAMMING, BUDGETING AND EXECUTION SYSTEM
PQA	PRELIMINARY QUANTITATIVE ANALYSIS
P3I	PRE-PLANNED PRODUCT IMPROVEMENT
PULHES	PHYSICAL CAPACITY OR STAMINA; U-UPPER EXTREMITIES; L-LOWER EXTREMITIES; H-HEARING AND EARS; E-EYES; AND PSYCHIATRIC
PV	PRODUCTION VALIDATION
QQPRI	QUALITATIVE AND QUANTITATIVE PERSONNEL REQUIREMENTS INFORMATION
QRR	QUALITATIVE RESEARCH REQUIREMENT

RAM	RELIABILITY, AVAILABILITY, AND MAINTAINABILITY
ROC	REQUIRED OPERATIONAL CAPABILITY
ROI	RETURN ON INVESTMENT
SACS	STRUCTURE AND COMPOSITION SYSTEM
SADM	SYSTEM ACQUISITION DECISION MEMORANDUM
SAR	SAFETY ASSESSMENT REPORT
SCP	SYSTEM CONCEPT PAPER
SMA	SUBJECT MATTER ASSESSMENT
SME	SUBJECT MATTER EXPERT
SMMP	SYSTEM MANPRINT MANAGEMENT PLAN
SOW	STATEMENT OF WORK
SPE	SYSTEM PERFORMANCE EVALUATION
SQI	SPECIAL QUALIFICATION IDENTIFIER
SSG	STAFF STUDY GROUP
SSI	SPECIALTY SKILL IDENTIFIER
SSP	SYSTEM SUPPORT PACKAGE
STAR	SYSTEM THREAT ASSESSMENT REPORT
STF	SPECIAL TASK FORCE
TAA	TOTAL ARMY ANALYSIS
TAADS	THE ARMY AUTHORIZATION DOCUMENT SYSTEM
TAD	TARGET AUDIENCE DESCRIPTION
TAG	TECHNICAL ADVISORY GROUP
TBOIP	TENTATIVE BASIS OF ISSUE PLAN
TCA	TASK COMPARABILITY ANALYSIS
TD	TRAINING DEVELOPER
TDA	TABLE OF DISTRIBUTION AND ALLOWANCES
TDL	TRAINING DEVICE LETTER REQUIREMENTS
TDS	TRAINING DEVELOPMENTS STUDY
TE	TEST EQUIPMENT
TEA	TRAINING EFFECTIVENESS ANALYSIS
TEMP	TEST AND EVALUATION MASTER PLAN
TIWG	TEST INTEGRATION WORKING GROUP
TMOE	TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT
TOA	TRADE-OFF ANALYSIS
TOO	TRADE-OFF DETERMINATION
TOE	TABLE OF ORGANIZATION AND EQUIPMENT
TPCA	TASK PERFORMANCE CAPABILITY ANALYSIS
TPRA	TASK PERFORMANCE REQUIREMENTS ANALYSIS
TQPRI	TENTATIVE QUALITATIVE AND QUANTITATIVE PERSONNEL REQUIREMENTS INFORMATION
TRACE	TOTAL RISK ASSESSMENT COST ESTIMATE
TSM	TRADOC SYSTEM MANAGER
TSWG	TEST SUPPORT WORK GROUP
TTHS	TRANSIENTS, TRAINEES, HOLDEES, AND STUDENTS
UT	USER TESTING
WS	WORK STATEMENT
WSAP	WEAPON SYSTEM ACQUISITION PROCESS

## APPENDIX D

### GLOSSARY

#### ACCIDENT

Any unplanned event or series of events that result in death, injury, or illness to personnel; damage to or loss of equipment or property.

#### ACCIDENT RISK ASSESSMENT SUMMARY

A document that provides a comprehensive evaluation of the safety risk being assumed for the system under consideration at the Milestone Decision Review.

#### ACQUISITION PLAN

The Acquisition Plan is derived from the Acquisition Strategy and summarizes acquisition background and need, objectives, conditions, strategy, and related functional planning (with emphasis on contractual aspects). It provides detailed planning for contracts and milestone charting.

#### ACQUISITION STRATEGY

The conceptual framework for conducting materiel acquisition, encompassing the broad concepts and objectives which direct and control the overall development, production, and deployment of a materiel system. It evolves in paralleled with the system's maturation. Acquisition strategy must be stable enough to provide continuity, but dynamic enough to accommodate change. It is documented as an annex to the Decision Coordinating Paper (DCP) at Milestone I.

#### ADDITIONAL SKILL IDENTIFIER

Consists of a letter and a number and may be added to the basic five-character MOS code to identify certain highly specialized skills that are in addition to the skills required by the MOS.

#### ADDITIVE OPERATION PROJECT (AOP)

A project that consists of equipment requirements in addition to the initial issue allowances in MTOE, TODA, or CTA. It automatically increases the Army acquisition objective (AAO) by the quantities cited in the project. It is an authorization for major commands to acquire materiel for theaters or CONUS stockage for the purpose of supporting

specific operations, contingencies, or war plans for specific geographic areas and worldwide base development.

#### AFFORDABILITY

A function of cost, priority, and availability of fiscal and manpower resources.

#### ANNUAL ACCESSIONS

The number of individuals who must be recruited in a year.

#### ANTHROPOMETRIC

Of or relating to the study of human body measurements, especially on a comparative basis.

#### ARMED FORCES QUALIFICATION TEST (AFQT)

The AFQT is a combination of Verbal (VE), Arithmetic Reasoning (AR), and Numerical Operations (NO) ASVAB subtests. The AFQT is used to screen out applicants whose mental characteristics are not sufficient for Army duties. The AFQT composite is a good general intelligence test as well as a practical index of reading ability.

#### ARMED FORCES VOCATIONAL APTITUDE BATTERY (ASVAB)

The ASVAB consists of a series of subtests which, when combined in various ways, produces 11 composite scores. The composite scores are used for two purposes: (1) to select applicants, and (2) to assign new accessions. Composite scores are used to assign new accessions to MOSs which have a need for personnel with necessary requisite aptitudes in specific areas. Most MOSs have entry requirements involving a minimum score on one or more of the ASVAB composites. For instance, MOS 68B (Aircraft Power Plant Repairer) requires a score of 100 on the Mechanical Maintenance (MM) composite for entry into the MOS. The ASVAB composites are good predictors for entry level personnel in diagnostic, procedural, administrative, and clerical types of tasks.

#### ARMY ACQUISITION OBJECTIVE (AAO)

Quantity of an item authorized for peacetime acquisition to equip the US Army-approved force and specified allies in peacetime, and sustain these forces in wartime from D-Day through the period, and at the level, of support prescribed by the latest OSD materiel support planning guidance.

#### ARMY ACQUISITION EXECUTIVE (AAE)

Principal advisor and staff assistant to the Secretary of the Army for acquisition of Army Systems.

#### ARMY OCCUPATIONAL SURVEY PROGRAM (AOSP)

With the cooperation of service schools, AOSP does research on Military Occupational Specialties (MOS). Using soldier tasks as the basic units of analysis, data is collected on such variables as percent performing, task learning difficulty and relative time spent. After the survey data has been analyzed, a report on the MOS is prepared.

#### ARMY PROGRAM FOR INDIVIDUAL TRAINING (ARPRINT)

A computer-developed document that identifies officer and enlisted training requirements. It contains information concerning the Active Army, Army Reserve, and Army National Guard, other U. S. services, and foreign military.

#### ARMY SYSTEM ACQUISITION REVIEW COUNCIL (ASARC)

A top level DA corporate body for systems acquisition that provides advice and assistance to the Secretary of the Army. It covers DOD major programs and DAPs.

#### ASSOCIATED SUPPORT ITEMS OF EQUIPMENT (ASIOE)

An end item required for the operation, maintenance, and/or transportation of a BOIP item. ASIOE's are listed on the BOIP of the item they support. ASIOE's have their own line item number (LIN) and are separately documented in TOE/VTADS.

#### AVAILABILITY

A measure of the degree to which an item is in an operable and committable state at the start of the mission, when the mission is called for at an unknown (random) point in time.

#### AVAILABILITY RATIO

An estimate of the availability of an MOS to support a proposed system.

#### BASELINE COST ESTIMATE (BCE)

A document prepared by the materiel developer. A detailed estimate of acquisition and ownership normally required for high level decisions. It provides the basis for subsequent tracking and auditing.

#### **BASLINE COMPARISON SYSTEM (BCS)**

A current operational system, or a composite of current operational subsystems, which most closely represents the design, operational and support characteristics of the new system under development (MIL-STD-1388-1A).

#### **BASIS OF ISSUE PLAN (BOIP)**

A planning document that lists: specific levels at which a new item of materiel may be placed in a unit/organization; the quantity of the item proposed for each organization element; and other equipment and personnel changes required as a result of the introduction of the new item. The BOIP is not an authorization document.

#### **BEST TECHNICAL APPROACH (BTA)**

A document prepared by a Special Task Force (STF) or Special Study Group (SSG), or jointly by the combat developer and materiel developer during concept exploration. It identifies the best general technical approach based on results of the Trade-Off Determination (TOD) and an analysis of trade-offs among support concepts, technical concepts, life cycle costs, and schedules.

#### **BILL PAYER**

An older system that is currently consuming MPT resources. It will be phased out of the inventory upon fielding of the new system.

#### **COMMON TABLE OF ALLOWANCES (CTA)**

An authorization document for common-usage items needed by individuals in TOE, TDA, or JTA units and activities Army-wide.

#### **COMPARABILITY ANALYSIS**

A process by which estimates of the human resource requirements of an emerging weapon system are derived from the known requirements of similar operational systems and subsystems.

#### **COMPARABLE TASK**

The task closest to a new task in terms of task criticality and similarity to type or class of task.

## CONCEPT FORMULATION PACKAGE (CFP)

The documentary evidence that the concept formulation effort has satisfied the concept formulation objectives. The package consists of a Trade-Off Determination (TOD), Trade-Off Analysis (TOA), Best Technical Approach (BTA), and Cost and Operational Effectiveness Analysis (COEA).

## CONTINUOUS COMPREHENSIVE EVALUATION (C<sup>2</sup>E)

A continuous process, extending from concept definition through deployment, which evaluates the operational effectiveness and suitability of a system through analyses of all available data.

## CORRECTIVE MAINTENANCE (CM)

Any action performed to restore an inoperable item to an operable condition (MIL-STD 1388-1A).

## COST AND OPERATIONAL EFFECTIVENESS ANALYSIS (COEA)

A documented investigation of the comparative effectiveness of alternative means to meet a defined threat. The cost of developing, producing, distributing, and sustaining each alternative system in a military environment for a time preceding the system's combat application. Also, a documented investigation of a valid requirement that HQ TRADOC and HQDA have approved.

## COST AND TRAINING EFFECTIVENESS ANALYSIS (CTEA)

A methodology which involves a documented investigation of the comparative effectiveness and costs of alternative training systems for attaining defined performance objectives, taking into consideration usage patterns and training scenarios. A CTEA can examine training concepts, training equipment, training strategies, programs of instruction, training implications of new materiel, organization, tactics, employment techniques, or families of systems.

## CREW MAINTENANCE

Maintenance actions that are performed by the personnel whose principal duty is to operate a system.

## CRITICAL ISSUE

Those issues associated with the development of an item or system that are of primary importance to the decision authority in reaching a decision to allow the item or system to continue into the next phase of development.

## CRITICAL RESOURCES

The implementation or management risk associated with the introduction of a new system. This risk involves manpower, personnel, and training demands created by the new system compared to the present or projected supply.

## DECISION COORDINATING PAPER (DCP)

A decision paper that gives the reason for starting, continuing, changing, or stopping a development program at each critical decision point during the acquisition process.

## DELTA

A Greek letter that represents a change in the manpower, personnel, or training requirements cited in output reports.

## DEPOT MAINTENANCE

Maintenance involving the overhaul of economically repairable materiel which augments the procurement program in satisfying overall Army requirements. It also provides for repair of materiel beyond the capability of general support maintenance organizations (AR 310-25).

## DESIGN-TO-COST (DTC)

An acquisition management technique to achieve Defense system design that meets stated cost requirements. It is addressed on a continuing basis as part of a system's development and production process. It employs a determined effort to set and achieve the early establishment of realistic but rigorous cost objectives, goals, and thresholds.

## DESIGNATED ACQUISITION PROGRAM (DAP)

A program designated by the AAE for ASARC milestone review. Selection is based on resource requirements, complexity and Congressional interest.

## EMBEDDED TRAINING

Training that is available on an equipment system along with its primary operational function. The training is made available by components of the equipment that take advantage of the overall system capabilities.

## ENLISTED MASTER FILE (EMF)

An automated data file that contains personnel record data on every enlisted individual. From this file "breakouts" (e.g. ASVAB scores and associated data) can be obtained for every soldier in a given MOS.

## FIRST UNIT EQUIPPED (FUE)

The first troop unit to be equipped with the initial production items/systems (DA PAM 700-127).

## FOOTPRINT

The resources of an earlier system within which a new system must fit or closely match.

## GENERIC SYSTEM

A description of the general system configuration (equipment, software, and duty positions) required to fulfill all system functional requirements stated in Army Mission Area Analyses and System Concept Papers.

## HEALTH HAZARD

An existing or likely condition, inherent to the operation or use of materiel, that can cause death, injury, acute or chronic illness, disability and/or reduced job performance of personnel by exposure to:

- a. acoustical energy
- b. biological substances (pathogenic micro-organisms and sanitation)
- c. chemical substances (weapons/engine combustion products and other toxic matter)
- d. oxygen deficiency (crew/confined spaces and high altitude)
- e. radiation energy (ionizing/non-ionizing to include lasers)
- f. shock (acceleration and deceleration)

- g. temperature extremes and humidity (heat and cold injury)
- h. trauma (blunt/sharp instruments including muscular/skeletal)
- i. vibration (whole body and segmental)

#### HEALTH HAZARD ASSESSMENT (HHA)

The application of biomedical and psychological knowledge and principles to identify, evaluate, and control risks to the health and effectiveness of personnel who test, use, or service Army systems.

#### HIGH DRIVER TASKS

A task identified, through analysis of task criteria, as costly in manpower, personnel and training resources. The primary objective of Early Comparability Analysis (ECA) is to aid Combat Developers in identifying "high drivers" requiring a design change so that these tasks can be reduced in number or completely eliminated from new system design. Information from tasks derived from predecessor or reference systems is the key to determining the impact these tasks have on Army MPT resources.

#### HUMAN FACTORS ENGINEERING ANALYSIS (HFEA)

HFEA deals with the comprehensive integration of soldier characteristics into Army doctrine and systems. It is used in system definition, design, development and evaluation in order to optimize the capabilities and performance of human-machine combinations. It includes the principles and techniques of the science of human engineering, and covers all aspects of the soldier-machine interface. HFEA considers all relevant information pertaining to the following:

- a. Human characteristics
- b. Anthropometric data
- c. System interface requirements
- d. Human performance
- e. Biomedical factors
- f. Safety factors

#### IN-PROCESS REVIEW (IPR) PROGRAM

Army acquisition programs other than DOD major or Designated Acquisition Programs.

### INDEPENDENT COST ESTIMATE (ICE)

A cost estimate developed in organizational channels, separate and independent from program proponent channels, and having the express purpose of serving as an analytical tool to validate or cross-check cost estimates developed in proponent channels.

### INDIVIDUAL AND COLLECTIVE TRAINING PLAN (ICTP)

The ICTP identifies the training concept, strategy, and requirements for the system from initial qualification through sustainment and follow-on training for all MOSs and all skill levels.

### INTEGRATED LOGISTIC SUPPORT (ILS)

A composite of all support considerations necessary to assure the effective and economical support of a system at all levels of maintenance throughout its programmed life cycle. It is a unified and iterative approach to the management and technical activities designed to:

- a. Influence operational and materiel requirements and design specifications;
- b. Define the support requirements best related to system design and to each other;
- c. Develop and acquire the needed support;
- d. Provide required operational phase support at lowest level;
- e. Seek readiness and life-cycle costs (LCC) improvements in the materiel system and support systems during the operational life-cycle;
- f. Repeatedly examine support requirements throughout the service life of the system;

### JOB ANALYSIS

The basic method used to obtain salient facts about a job involving: observation of workers, conversations with those who know the job, analysis of questionnaires completed by job incumbents, and study of documents involved in performance of the job (AR 310-25).

## JUSTIFICATION FOR MAJOR SYSTEM NEW START (JMSNS)

The JMSNS defines a deficiency such that there is a reasonable probability of satisfying a need through the acquisition of a single system. It is designated by the Secretary of Defense when acquisition costs are greater than \$200 million RDT&E or \$1 billion in procurement.

## LEARNING ANALYSIS

A procedure used to identify the skills and knowledge that must be acquired before a soldier can demonstrate mastery of a training objective.

## LOGISTIC SUPPORT ANALYSIS (LSA)

An analytical technique used by integrated logistic support management to provide a continuous dialogue between designers and logisticians. LSA is a system to identify, define, analyze, quantify, and process logistics support requirements for materiel acquisition programs.

## MAINTAINABILITY

The ability to retain or restore an item to a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair.

## MAINTENANCE LEVEL

The four basic levels of maintenance are: organizational, direct support, general support and depot.

## MANPOWER

The personnel strength (military and civilian) expressed in terms of the number of men and women available to the Army. In the MAP, manpower analyses and actions are necessarily conducted in conjunction with force structure and budget processes. If given manpower priorities established by the Department of the Army cannot be supported by projected manpower resources, then changes in system design, organization, or doctrine are made.

## MANPOWER REQUIREMENTS CRITERIA (MARC)

The number of direct workers required to effectively perform a specified work activity. A principal computational component of MARC is the estimate of Annual Maintenance Man Hours (AMMH) and its variations (AAMMH, DPAMMH, and IPAMMH), each of which represents different contributing factors to the overall maintenance manpower and personnel determination. The AMMH, AAMMH, DPAMMH, and IPAMMH are MARC components of a system from the perspective of the factors each represents. These MARC components are defined below:

a. Annual Maintenance Man Hours (AMMH) consist of the DPAMMH and the IPAMMH required to repair an item.

b. Annual Available Maintenance Man Hours (AAMMH) are the annual man-hours each repairer is expected to be available under sustained operating conditions (e.g. wartime).

c. Direct Productive Annual Maintenance Man Hours (DPAMMH) are the estimated wrench-turning hours required to repair a component or assembly of an item.

d. Indirect Productive Available Maintenance Man Hours (IPAMMH) are measured in terms of a task that indirectly supports the DPAMMH process (e.g. to obtain parts, tools, waiting for a wrecker).

## MANPOWER AND PERSONNEL INTEGRATION (MANPRINT)

(See Appendix B)

## MILITARY OCCUPATIONAL SPECIALTY (MOS)

A term used to identify a grouping of duty positions possessing such close occupational or functional relationships that an optimal degree of interchangeability among persons so classified exists at any given skill level.

## MISSION AREA ANALYSIS (MAA)

An assessment of the capability of a force to perform given a particular battlefield or functional area. The analysis is designed to discover deficiencies in doctrine, organizations training, and materiel and to identify a means of correcting these deficiencies it stresses: first, doctrinal solutions; then, training solutions; then, organizational solutions; and finally, materiel solutions.

## MATERIEL ACQUISITION PROCESS (MAP)

The sequence of acquisition activities beginning with the identification of a mission area deficiency and extending through the introduction of a system into operational use.

## MISSION AREA DEVELOPMENT PLAN (MADP)

The MADP transitions the MAA corrective actions to specific projects with milestone schedules so that resources can be applied to the elimination of the MAA deficiency. Each mission area proponent (TRADOC school) publishes a MADP annually. MADP contains sections on materiel, doctrinal, organizational, and training corrective actions.

## NON-DEVELOPMENT ITEM (NDI)

NDIs are those items determined by a Materiel Acquisition Decision Process (MADP) Review (i.e., DSARC, ASARC, or IPR) to be available for acquisition to satisfy an approved materiel requirement with no expenditure of Army research, development, test, and evaluation (RDTE) funds. The item may be a commercial product or an item which has been developed and used by another Service, country, or government agency.

## OPERATIONAL AND ORGANIZATIONAL PLAN (O&O PLAN)

An operational, organizational, training, and logistical plan for the employment of specific hardware systems within Army organizations. O&O Plans are based on operational concepts and are developed in conjunction with those concepts. Each O&O Plan should be able to trace its lineage through one or more functional concepts to the basic (umbrella) concept.

## PERSONNEL

Military and civilian individuals of the skill level and grades required to operate and support a system, in peacetime and war.

## PERTURBATION VALUES

A quantitative representation of the impact of the design differences between the Baseline Comparison System and the Proposed System.

#### PREDECESSOR SYSTEM

A currently fielded Army system that will eventually be replaced by a future system designed to perform the same mission.

#### PROPOSED SYSTEM

A Conceptual design used to determine the functional requirements of a new system. It incorporates the technological advances likely to exist before the system's projected initial operational capability date.

#### PRELIMINARY HAZARD ANALYSIS (PHA)

The PHA is the initial effort in hazard analysis during the system design phase, or the programming and requirements development phase, or on operational system. The purpose of the PHA is not to control all risks but to identify hazardous states and their underlying system implications.

#### PREPLANNED PRODUCT IMPROVEMENTS (P<sup>3</sup>I)

The planned future evolutionary improvement of developmental systems, for which design considerations are effected during development, to enhance future application of projected technology. They include improvements planned for ongoing systems that extend beyond the current performance envelope to achieve a needed operational capability.

#### PRODUCT IMPROVEMENT PROGRAM (PIP)

A program involving engineering and testing efforts on major end items, depot repairable components, or than developmental items. The program is designed to improve a system's combat effectiveness or extend its the useful military life.

#### RELIABILITY

A fundamental characteristic of materiel, expressed as the probability that an item will perform its intended function for a specified interval under stated conditions. Durability is a special case of reliability.

## RELIABILITY, AVAILABILITY, MAINTAINABILITY (RAM)

RAM are those requirements imposed on materiel systems to ensure they are operationally ready for use when needed, will successfully perform assigned functions, and can be economically operated and maintained within the scope of logistics concepts and policies. RAM programs are applicable to materiel systems, test measurement and diagnostic equipment (TMDE), training devices and facilities that are developed, produced, maintained, procured or modified for Army use. Reliability is the probability that an item will perform its intended function for a specified time under stated conditions. Availability is a measure of the degree to which an item is in an operable and committable state at the start of the mission. Maintainability is the ability of an item to be retained in or restored to a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair.

## REQUIRED OPERATIONAL CAPABILITY (ROC)

A document which states concisely (usually in four pages or less) the minimum essential operational, technical, logistic, and cost information necessary to initiate full-scale development or procurement of a materiel system.

## RESIDUAL HAZARDS

Hazards that are not eliminated by design.

## SAFETY ASSESSMENT REPORT

A formal summary of the safety data collected during the design and development of the system. It summarizes the hazard potential of the item, provides a risk assessment, and recommends procedures or other corrective actions to reduce these hazards to an acceptable level.

## SKILL CREEP

A technology driven trend toward increasing personnel skill requirements with each new generation of equipment.

## SOLDIER/MACHINE INTERFACE

A consideration of equipment design and operational concepts to ensure they are compatible with the capabilities and limitations of operators and maintenance personnel. It is also referred to as soldier-materiel interface and soldier-machine interaction.

## SUPPORTABILITY

That characteristic of materiel indicative of its ability to be sustained at a required readiness level when supported in accordance with specified concepts and procedures.

## SYSTEM

A composite, at any level of complexity, of personnel, procedures, materials, tools, equipment, facilities, and software. The elements of this composite are used together in the intended operational or support environment to perform a given task or achieve a specific production, support, or mission requirement.

## TARGET POPULATION

The specific population used in a training developments effort to ensure that training products are compatible with the personnel in the field. Also, the population used to establish the parameters for the baseline (skills and knowledge) entry point for officer or enlisted specialty training requirements.

## TASK

The simplest level of behavior that describes the performance of a meaningful function in a job under consideration. Tasks are:

- a. Observable actions
- b. Measurable actions (in terms of performance)
- c. Actions with a definite beginning and end
- d. Actions which take a relatively short time (minutes or hours versus days or weeks)
- e. Independent actions

To the extent that individual tasks are crucial to the determination of the MPT impact of a new system design, the tasks become a common language for combat developers, system designers, training developers and training evaluators.

## TASK ANALYSIS

A process of reviewing actual job content and context in order to classify information into units of work within a job. The process provides a procedure for isolating each unique unit of work, provides a procedure for describing each unit of work accomplished, and provides descriptive information to assist in the design and testing of training products.

## TEST AND EVALUATION MASTER PLAN (TEMP)

A document used, in the Army review and decision process, to assess the adequacy of planned testing and evaluation. It is prepared for all defense system acquisition programs. The TEMP is a broad plan that relates test objectives to required system characteristics and critical issues and integrates objectives, responsibilities, resources, and schedules for all T&E to be accomplished. It replaces the Coordinated Test Plan (CTP).

## TOOTH-TO-TAIL

The issue of combat (Tooth) versus support (Tail) requirements for emerging systems.

## TOTAL RISK ASSESSING COST ESTIMATE (TRACE)

Expected cost over a specified period of a materiel development program computed on the basis of cost of accomplishing work elements of work breakdown structure, including specific provisions for statistical estimation of probable costs otherwise indeterminate.

## TRADE-OFF ANALYSIS (TOA)

A document prepared by a Special Task Force (STF) or Special Study Group (SSG), or jointly by the combat and materiel developers, to determine which technical approach, described in the Trade-Off Determination (TOD), is best.

## TRAINING

The process required to impart the requisite knowledge, skills, and abilities to qualify Army personnel for use, operation, maintenance and support of Army systems or items. Training considerations include: the formulation and selection of engineering design alternatives which are supportable from a training perspective; the documentation of training strategies; and the timely determination of resource requirements to enable the Army training system to support system fielding. Training is linked with personnel analyses and actions in that availability of qualified personnel is a direct function of the training process. Additional MANPRINT training considerations are:

- a. Training effort and costs versus system design
- b. Training times
- c. Training program development, considering aptitudes of available personnel

- d. Sustainment training, as distinguished from training associated with initial system fielding
- e. Developmental training, as distinguished from Initial Entry Training
- f. Training devices -- design, development and use
- g. Training base resourcing -- manpower and personnel implications
- h. New Equipment Training
- i. Formal training base instruction, versus on-the-job training (OJT) in units
- j. Unit training
- k. Operational testing of the adequacy of training programs and techniques

#### TRAINING DEVICE (TD)

Any three-dimensional object developed, fabricated or procured specifically for improving the learning process. Training devices may be either system devices or non-system devices.

- a. System devices are designed for use with one system or item of equipment, including subassemblies and components.

- b. Non-system devices are designed to support general military training and/or for use with more than one system or item of equipment, including subassemblies and components.

#### TRANSIENTS, TRAINEES, HOLDEES, AND STUDENTS RATES (TTHS)

The percentage of personnel in a paygrade who are reassignable and are therefore unable to contribute to the work associated with the weapon system.

#### WORKLOAD

The amount of work, stated in predetermined work units, that organizations or individuals perform or are responsible for performing (AR 310-25).